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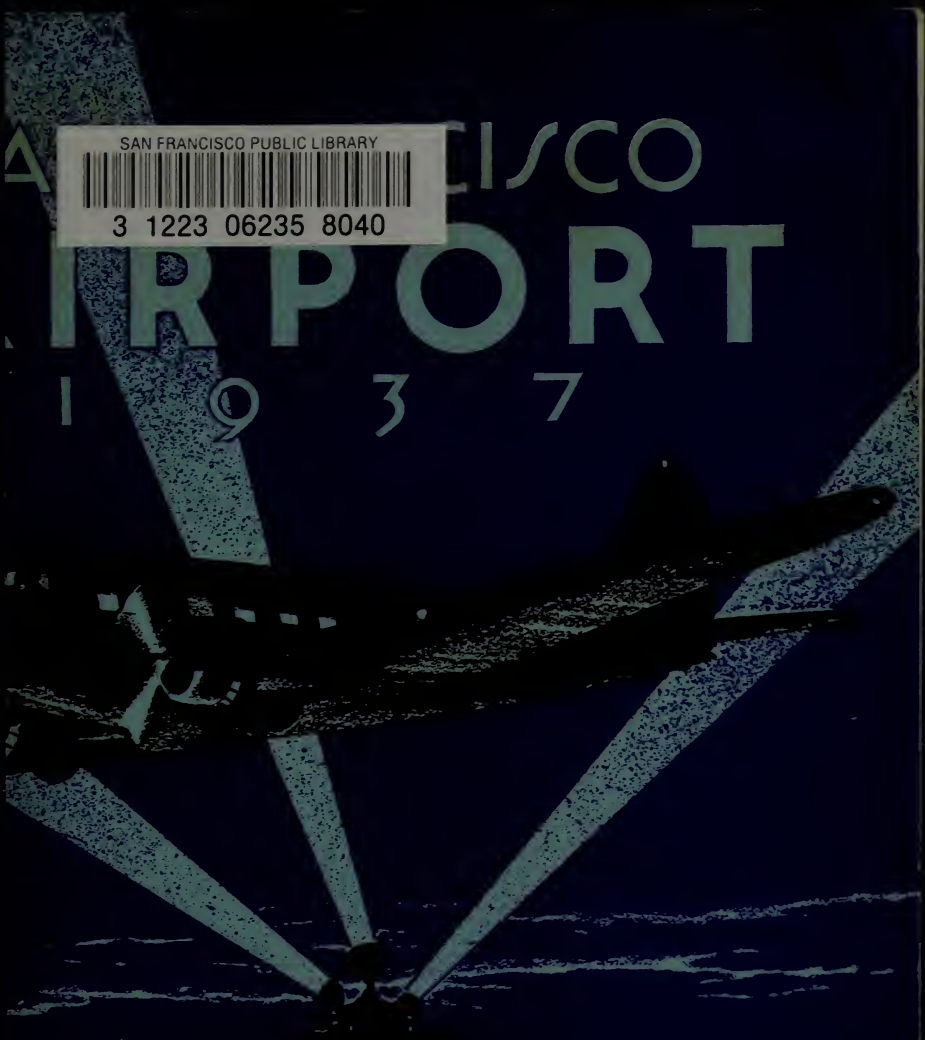

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SAN FRANCISCO AIRPORT—ADMINISTRATION BUILDING, SOUTHEAST ELEVATION

SAN FRANCISCO AIRPORT

1937

Including Financial and Traffic Report
for Fiscal Year Ending June 30, 1936

PUBLIC UTILITIES COMMISSION

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Foreword

THE STATUS of San Francisco Airport has passed from that of national to international renown. Its position as one of the leading air terminals of the world has become definitely assured during the past fiscal year by the execution of a contract with Pan American Airways whereby this largest of air transport lines in the world will establish its Pacific Coast headquarters at the Municipal Airport. The contract stipulates that the City and County of San Francisco shall construct a seaplane base on the northern section of our Airport property. Funds have been assured through appropriations of the Federal Works Progress Administration, and necessary channel dredging will be done by the United States Army Engineers. Work on the seaplane base was begun in December, 1935. Plans call for the construction of one of the most complete and modern bases in the world, which in conjunction with the development plans for the Airport proper guarantees San Francisco a position of world wide importance in the field of air transportation.

Aviation, even today, is considered by many to be but in its infancy. Balancing accomplishments against future possibilities we find the scale tilting heavily to the side of the latter, but this by no means indicates that remarkable strides have not been made in aeronautical development.

Airport Shares in Aeronautical Development:

That San Francisco Airport proper, apart from its seaplane possibilities, is sharing in the world's aeronautical advancement is indicated by its well balanced program of development. It has grown in acreage and its surface and structures have been materially improved; its activities are well organized and plans for the future are well defined; transport, transient, and local flying have increased with remarkable strides.

Air travelers passing through the Airport are deeply impressed by the large scale improvements under way. Upwards of two thousand men on WPA and City payrolls have been employed on field development work, and plans for the future run into several millions of dollars. A detailed account of the construction work completed is included under a separate heading a few pages hence, but some of the more important developments may be mentioned at this point.

Field Extension Project Completed:

The field extension project under way at the close of the 1934-35 fiscal year, by which 38 acres of reclaimed tide flats were being added to the field in triangular shape on the east, was completed in November, 1935. This addition provided room for two 3,000 foot paved runways. A third landing strip, north-northeast to south-southwest, will soon be made available for use and paved.

New Administration Building:

A most important improvement is the construction of a new administration building. The structure is of two-story design with a double-deck traffic control

ABOVE—SAN FRANCISCO AIRPORT BEFORE RECLAMATION OF 38 ACRES OF TIDELAND ON EAST.

BELOW—VIEW AFTER COMPLETION OF RECLAMATION FINANCED BY $260,000 PWA BOND ISSUE.

tower atop. Its dimensions are 90 x 225 feet, with provision for a 50 foot addition on the north end to be added later. Complete facilities for modern airport needs are embodied in the building, the result of extensive study on the part of the Airport Management, Utilities' Engineers and Architects. Every comfort and convenience is provided for passengers, tenants and personnel, and provision for future needs have been carefully included. The building shows a happy combination of attractiveness and efficiency, and is second to none in the field of airport administrative structures.

Many Minor Improvements Effected:

Paving in and around the Airport administrative area has been extended, a new sewerage system and water main have been installed, and many projects of a minor nature, described elsewhere in this report, have been completed. Thus, many improvements have been effected and others have been progressing during the course of the past twelve months, but the final result of a program so extensive will not show itself with proper impressiveness until completion moulds the individual projects into a unified whole, at which time San Francisco will have a land and seaplane base second to none in the world.

Pronounced Traffic Increase:

Field improvement without a corresponding increase in business activity would be an unwarranted expense, and conversely an increase in business activity could not be expected if field improvement and facilities could not keep pace with business needs. That the improvements mentioned above have been justified and that an appropriate balance is being maintained may be shown by a consideration of basic increases in business.

Tabulated traffic data are included elsewhere in this report, but suffice to examine here a few of the more important figures. During the past fiscal year:

Transport Plane Arrivals and Departures Increased	18%
Passengers On and Off (excluding through passengers) increased	22%
Mail Pounds Out Increased	32%
Express Pounds Out Increased	53%

Such advances call for careful planning, in order that San Francisco Airport may have adequate facilities for future business needs, and reap its share of the revenue and prestige that must come from the new industry of the air.

Yerba Buena Shoals, Future Airport Site:

Looking forward some four years, it is realized that transport activity in the Bay area will have advanced to the point where a separate, centralized terminal will be required for airline use. Bureau of Air Commerce rules are tending more and more toward provisions whereby school training flights and those of a private nature will not be allowed at the same field used by transport planes. Since both types of flying are bound to increase it will be necessary to provide two airports, one to be used as a terminal for the loading and discharging of passengers, mail and express, and the other to be used as a base for local flying activities.

With this realization, provision has been made for an airport on the Yerba Buena shoals, the site to be occupied by the Golden Gate International Exposi-

tion in 1939. The site is being developed with this thought in mind. When turned into an airport after the Exposition is over it will provide room for a 4 000 foot runway in any direction. Three of the principal Exposition buildings are being designed for future airport use. They will form the Airport's administrative area, with an administration building to cost some $800,000, and two huge hangars to cost $400,000 each. Thus it is apparent that San Francisco's future position in the realm of air transportation is definitely assured.

Stearman-Hammond Aircraft Factory Adjoins Airport:

With our Airport's future status as a world renowned land and seaplane base defined, it is but natural that aviation industries should be attracted to the proximity of the field. During the past few months negotiations have been completed whereby a new aircraft factory, that of the Stearman-Hammond Aircraft Corporation, will be established at a site adjoining the Airport on the north. Production of the "Stearman-Hammond Model Y" airplane will be begun in October of this year. The intervening months will be spent in enlarging and remodeling the structures now present on the property.

This aircraft has oustanding possibilities in that it is the first of its kind in the United States. The "Model Y" airplane is a "flivver" type, fool-proof craft, capable of carrying a pilot, one passenger and 100 pounds of baggage at a speed of 120 miles an hour. Hydraulic brakes stop the plane fully loaded at take-off speed in 140 feet, a feature which permits the pilot to change his mind at the last minute. Minimum speed is set at 39 miles an hour. The plane was pronounced winner in a nation-wide contest sponsored by the Bureau of Air Commerce for

LAND ADJACENT TO SAN FRANCISCO AIRPORT IS AVAILABLE FOR AIRCRAFT INDUSTRIES. PHOTO SHOWS NEW STEARMAN-HAMMOND FACTORY AND PLANE.

the design of a small airplane, with paramount consideration being given to safe and simple operation. It is unconventional in appearance in that the motor is mounted to the rear of the cabin, and a third wheel is added to the landing gear directly under the nose or cabin of the plane. The rudder will be entirely eliminated and the plane's maneuvers handled with two-dimentional control, that is, the steering wheel being used for banking and turning, with fore and aft motion of the wheel controlling altitude. Tests have shown that the plane can be caused to take off or land without the pilot so much as touching the controls.

The factory is assured of a successful start in that the Bureau of Air Commerce has placed an order for fifteen of the craft. Offices of the corporation will be temporarily opened at San Francisco Airport pending completion of the factory renovation.

TRANSPORT TRAFFIC

During the course of a year many landings and takeoffs of an itinerant nature are made at San Francisco Airport, all of which contribute to public service and provide revenue, but the basic activity upon which the Airport must depend if it is to be considered a successful part of the Public Utilities organization is scheduled air transport operation. The present Airport management has been mindful of this fact from the beginning, and has laid development plans accordingly, neglecting in no way the interests of private tenants and transient pilots, who likewise benefit in a general way from the prestige and business resulting from transport activity.

United Air Lines Operations Increase:

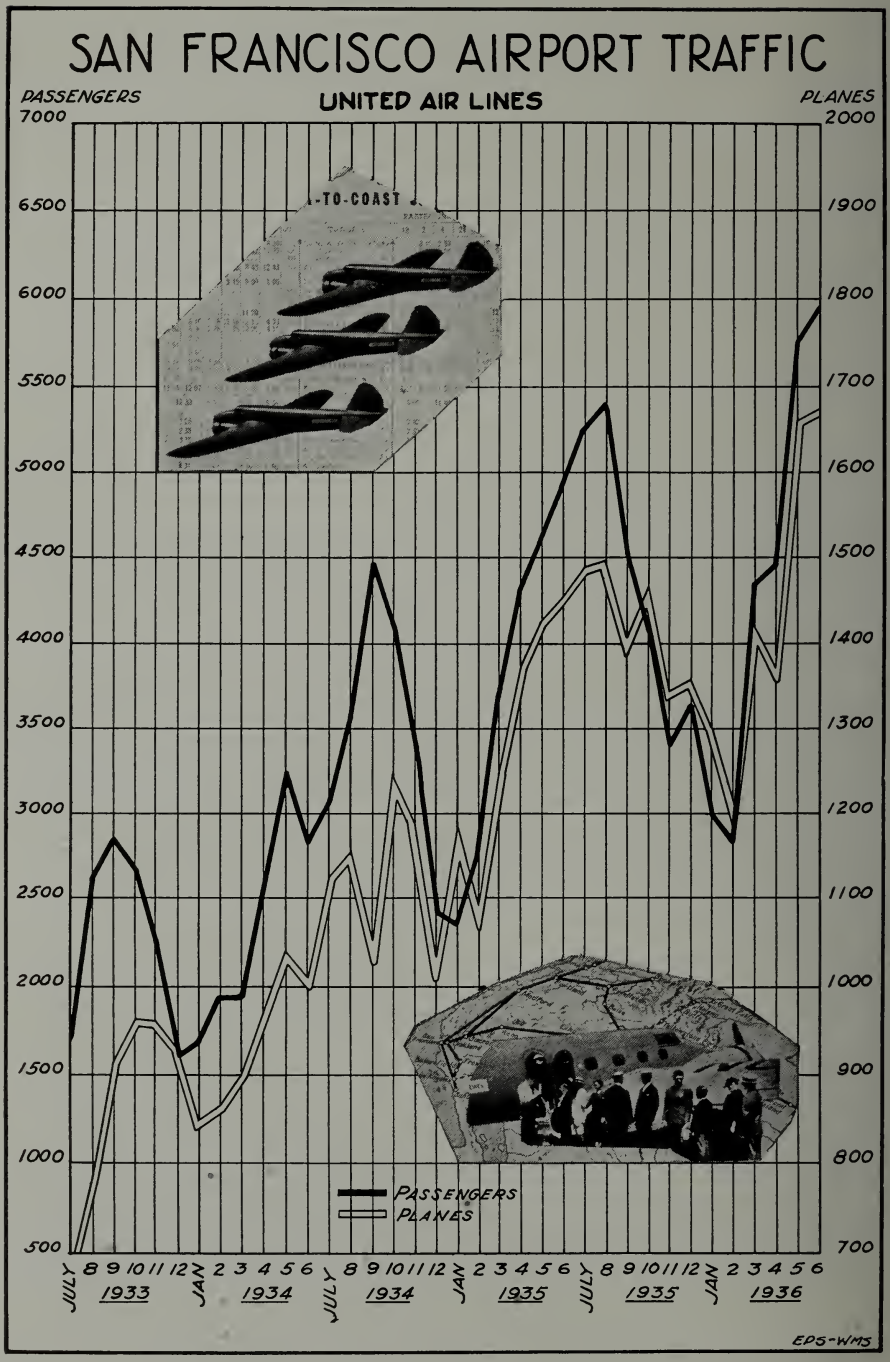
As was the case at the close of the 1934-35 fiscal year, United Air Lines is the only transport company operating in northern California, and therefore the only transport line using San Francisco Airport. However, this organization is of international renown, having flown more miles than any air line in the world. Department of Commerce statistics for the fiscal year 1935-36 reveal that planes of this line flew 16,346,263 miles, or 35 per cent more miles than its nearest competitor. Its mileage was 27 per cent of the total miles flown by all domestic air lines of the United States put together. The extent to which its operations have progressed at San Francisco Airport may be learned from a few pertinent figures.

The line moved its San Francisco terminal to this field early in 1933. Considering the three fiscal years that have elapsed since that time we find an increase of 58 per cent in transport plane arrivals and departures, and an increase of 89 per cent in passengers on and off, excluding through passengers. The figures are as follows:

	1933-34	1934-35	1935-36	Increase Two Years	Increase Past Year
Arrivals and Departures.....	10,872	14,600	17,192	58%	18%
Passengers On and Off.....	28,112	43,643	53,079	89%	22%

Air Mail and Express Increases:

Considering mail and express cargo handled by air carriers at San Francisco Airport during the past three years we find increases of great magnitude. The fact may be recalled that prior to cancellation of air mail contracts in February 1934, Transcontinental & Western Air, Inc., was likewise operating schedules between San Francisco Airport and Los Angeles, carrying passengers, mail and


SAN FRANCISCO AIRPORT TRAFFIC
UNITED AIR LINES
PASSENGERS
PLANES
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
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1900
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1100
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700
PASSENGERS
PLANES
JULY 8 9 10 11 12 JAN 2 3 4 5 6 JULY 8 9 10 11 12 JAN 2 3 4 5 6 JULY 8 9 10 11 12 JAN 2 3 4 5 6
1933 1934 1934 1935 1935 1936
EDS-WMS

express. Since that time United Air Lines has been the only transport line operating in northern California. The mail and express figures are as follows:

	1933-34	1934-35	1935-36	Increase Two Years	Increase Past Year
Mail Pounds Out	223,169	348,246	460,977	107%	32%
Express Pounds Out	100,410	247,508	378,370	277%	53%

(Note: Mail and Express cargo "In" not weighed at the Airport until the current year.)

Graphs accompany this report which show at a glance the decided advances in cargo and schedules, and data are likewise included in tabulated form. Notes explain decreases of a seasonal nature or those brought about by some specific cause. Such outstanding advances as have been made can be but the result of a genuine satisfaction on the part of the business firms and the general public with the manner in which air transport operations are conducted, and this despite the stringent economic conditions that have prevailed generally the past several years. The progress that has been made and the inherent possibilities of this industry of the air make it easy to understand the position of importance a municipal air terminal will occupy in future years.

Additional Airline Service:

Under present airmail laws United Air Lines is the only air mail and passenger line authorized to operate into the San Francisco bay region. These laws are now in process of amendment and Transcontinental Western Air Lines, who have long been requesting authority to come into the Airport, expect to inaugurate a new Transcontinental service via Winslow, Arizona, and Las Vegas, Nevada, in July or August of this year.

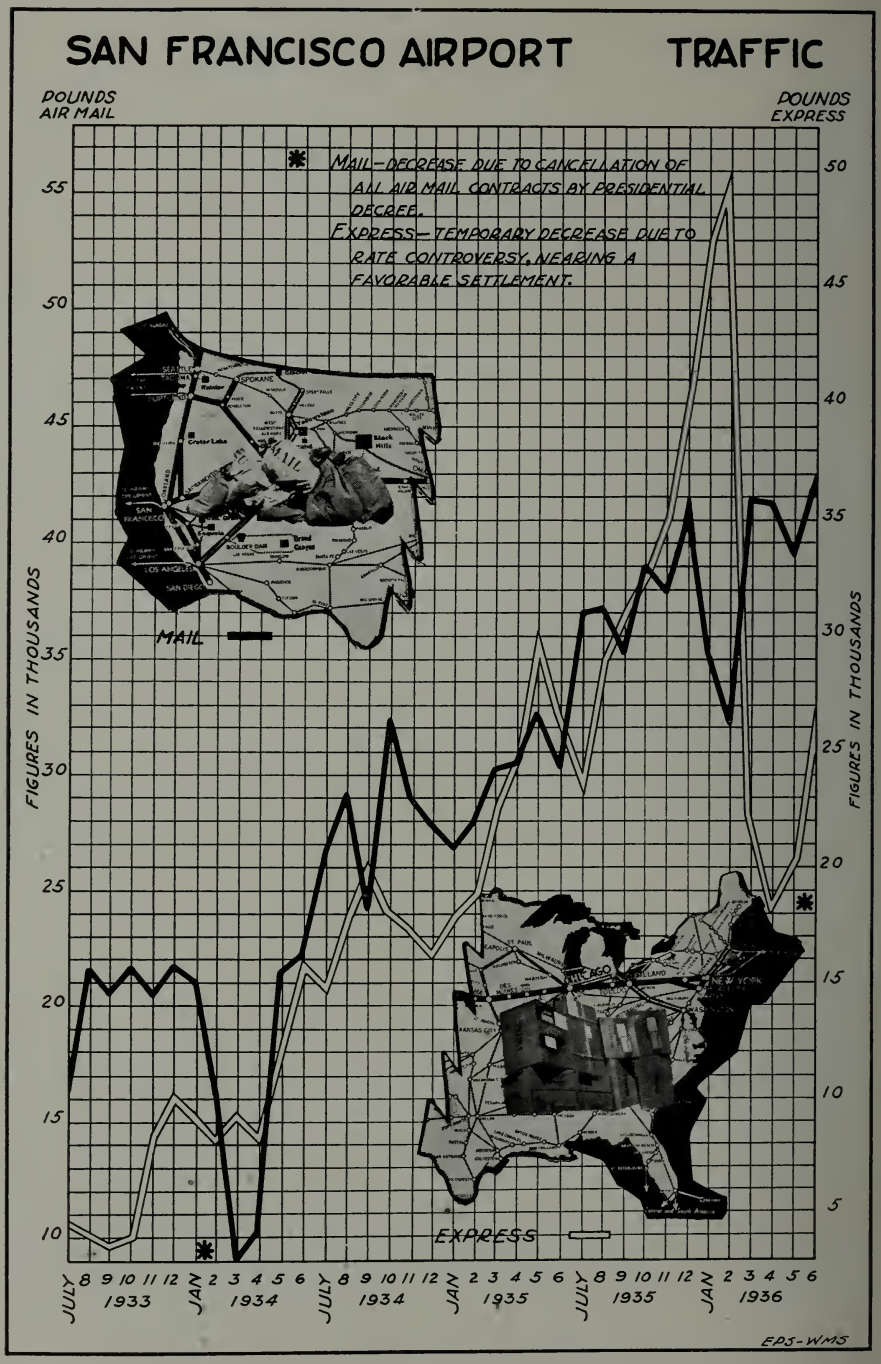
Besides affording the San Francisco Bay area additional mail and express service from the east, midwest and southwest, this route would unquestionably enhance the popularity of passenger air travel, for the flight from Albuquerque to San Francisco would pass over one of the most scenic sections of the world.

ADVANTAGES OF MODERN AIR TRAVEL

Stewardess Qualifications High:

Many travelers of today are still unaware of the comfort, convenience and dependability of modern air transportation. Air liners are now equipped with de-luxe reclining chairs, and passenger needs are efficiently and courteously cared for by a stewardess, who is chosen for her position only after satisfying many rigid qualifications, including that of being a trained nurse. This requirement insures a personnel of high intelligence and human understanding, and does much to promote the comfort of air travelers.

Plane cabins are cooled in summer by modern air conditioning units kept at the principal fields. Fresh, de-humidified, filtered air is circulated through the passenger compartments of planes just before departure, and cool levels in the upper air are sought after the flight gets under way. During winter months a modern heating system is in use. Thus comfortable trips the year round are provided.


SAN FRANCISCO AIRPORT TRAFFIC
POUNDS AIR MAIL
POUNDS EXPRESS
* MAIL—DECREASE DUE TO CANCELLATION OF ALL AIR MAIL CONTRACTS BY PRESIDENTIAL DECREE.
EXPRESS—TEMPORARY DECREASE DUE TO RATE CONTROVERSY, NEARING A FAVORABLE SETTLEMENT.
FIGURES IN THOUSANDS
FIGURES IN THOUSANDS
MAIL
EXPRESS
55 50 45 40 35 30 25 20 15 10
50 45 40 35 30 25 20 15 10 5
JULY 8 9 10 11 12 JAN 2 3 4 5 6 JULY 8 9 10 11 12 JAN 2 3 4 5 6 JULY 8 9 10 11 12 JAN 2 3 4 5 6
1933 1934 1934 1935 1935 1936
EPS-WMS

OPERATIONS OF UNITED AIR LINES AT SAN FRANCISCO AIRPORT

(Comparative figures for past two fiscal years)

Month	Transport Planes (Arrs. & Deps.) 1934-35	1935-36	Percent of Increase	*Passengers 1934-35 Off	On	1935-36 Off	On	Total Passengers Percent Increase	Pounds of Air Mail Out Only 1934-35	1935-36	Percent of Increase	Pounds of Air Express Out Only 1934-35	1935-36	Percent Increase or Decrease
July	1120	1494	33%	1569	1520	2624	2633	70%	26,798	37,012	38%	14,903	24,048	Plus 61%
August ...	1150	1500	30%	1760	1857	2673	2775	51%	29,156	37,201	28%	18,055	29,098	Plus 61%
September	1052	1404	33%	2208	2285	2193	2343	1%	24,133	35,375	47%	20,371	31,168	Plus 53%
October ..	1250	1470	18%	2008	2085	2088	2029	1%	32,460	39,092	20%	18,237	32,829	Plus 80%
November	1196	1326	11%	1669	1714	1649	1779	1%	28,910	37,951	31%	17,689	35,277	Plus 99%
December .	1052	1352	29%	1160	1271	1799	1868	51%	27,878	42,197	51%	16,478	40,704	Plus 147%
January ..	1182	1302	10%	1181	1161	1449	1553	28%	26,837	35,155	31%	18,083	47,015	Plus 160%
February .	1094	1214	11%	1315	1454	1412	1417	2%	28,025	32,171	15%	18,996	49,961	Plus 163%
March	1258	1418	13%	1848	1865	2113	2248	17%	30,274	41,941	39%	22,712	22,290	†Minus 2%
April	1372	1378	0.4%	2047	2273	2202	2271	4%	30,644	40,785	33%	24,912	18,616	†Minus 25%
May	1424	1662	17%	2252	2331	2882	2872	26%	32,750	39,509	21%	30,351	20,465	†Minus 33%
June	1450	1672	15%	2424	2386	2955	2982	23%	30,381	42,588	40%	26,721	26,899	Plus 1%
Totals ...	14,600	17,192	18%	21,441	22,202	26,309	26,770	22%	348,246	460,977	32%	247,508	378,370	Plus 53%
				43,643		53,079								

* Excluding Through Passengers

† Decrease due to rate controversy. Negotiations for favorable settlement nearing completion.

Comfortable, Scenic Flights:

Improvement in sound-proofing the walls of the plane and installing acoustical equipment has been successful to the point where passengers may chat freely with one another. Quiet, comfortable, speedy flights are possible over every major route. Trips are likewise thrilling and educational for the planes pass over some of the most scenic sections of the world. Regular air line service in the western part of the United States flies directly over such regions of renowned beauty as the Great Salt Lake and its snow-white desert, colorful Zion Canyon and Cedar Breaks, the Painted Desert, Boulder Dam over which the planes circle to give the passengers a complete view, the rugged, pine-clad Sierras, the Columbia River Gorge, and finally our own glorious Bay Region with its rolling hills, its coast range peaked by Mt. Tamalpias and Mt. Hamilton, its numerous Bay islands and inlets—abundant natural beauty appropriately supplemented by imposing works of man, most famous of which are the Bridges, spanning gracefully our San Francisco Bay and the world renowned Golden Gate.

Speed, The Essence of Air Travel:

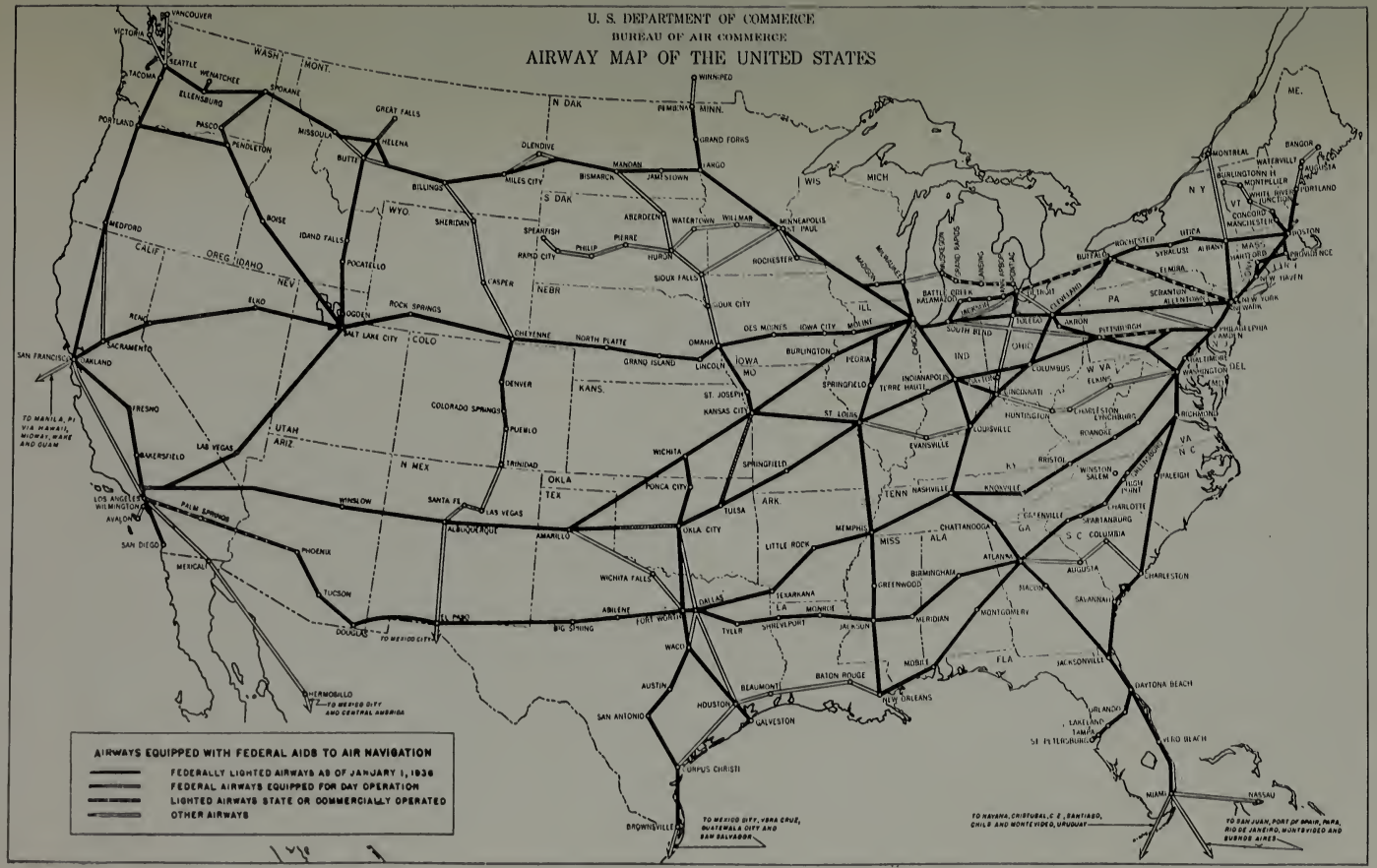
An appreciation of the convenience of modern air line service may be gained by considering the time saving element it provides in reaching centers of population throughout the nation. Today one can board a transport at San Francisco Airport and be in New York City in 16¾ hours. A reduction of 1¾ hours in this schedule has been effected during the past fiscal year. Chicago is today only 11 hours distant, Salt Lake City 4 hours, Seattle 5½ hours, Portland 4½ hours, Los Angeles 2 hours and San Diego 3 hours. An airline map of the United States shows a vast network of connections between trunk routes themselves and trunk and feeder lines running to smaller cities and towns. The system is expanding each month, reaching out into districts never before served by air transportation, and schedules over the established routes are being increased in number. Plans for the future already taking shape indicate that much larger and faster planes will be in use by the end of the coming fiscal year.

Safety—Prime Consideration:

That travel on scheduled air lines is decidedly safe is proven by statistics compiled by the Department of Commerce. During the past fiscal year 8,541,772 miles were flown by scheduled air lines per fatal accident. Considering passenger fatalities the statistics show that 10,584,534 passenger-miles were flown per passenger fatality. (A passenger-mile is the equivalent of 1 passenger carried 1 mile.) The total number of passengers carried by domestic and foreign routes of the United States was 967,134. Passenger fatalities numbered 38, or one in every 25,451 carried.

Fares—Economical Aspects:

Air line fares may at first thought seem expensive as compared with those of other modes of transportation. On going into the matter more thoroughly, however, it is found that frequently they are actually less expensive, due to various factors. When a passenger boards a transport plane, let us say for New York, his traveling expenses have ended. The pullman expense is eliminated, the diner expense of several days does not enter in, for during his entire flight the air line absorbs the expense of meals. Tips to personnel are prohibited. The expense of these and other incidentals are saved each passenger, and if by chance time is worth money the saving must run into large figures.


U. S. DEPARTMENT OF COMMERCE
BUREAU OF AIR COMMERCE
AIRWAY MAP OF THE UNITED STATES
AIRWAYS EQUIPPED WITH FEDERAL AIDS TO AIR NAVIGATION
FEDERALLY LIGHTED AIRWAYS AS OF JANUARY 1, 1936
FEDERAL AIRWAYS EQUIPPED FOR DAY OPERATION
LIGHTED AIRWAYS STATE OR COMMERCIALLY OPERATED
OTHER AIRWAYS
TO MANILA, PI VIA HAWAII, MIDWAY, WAKE AND GUAM
TO MEXICO CITY AND CENTRAL AMERICA
TO MEXICO CITY
TO MEXICO CITY, VERA CRUZ, GUATEMALA CITY AND SAN SALVADOR
TO HAVANA, CRISTOBAL, C. Z., SANTIAGO, CHILE AND MONTEVIDEO, URUGUAY
TO SAN JUAN, PORT OF SPAIN, NATAL, RIO DE JANEIRO, MONTEVIDEO AND BUENOS AIRES

SAN FRANCISCO AIRPORT IS DIRECTLY CONNECTED WITH FEDERAL AIRWAYS THROUGHOUT THE NATION

Limousine Service at Terminals:

A feature not to be overlooked by air travelers, tending toward both comfort and efficiency, is the limousine service awaiting them at air terminals. For a very nominal fee the passengers may board a waiting limousine at the Airport and be carried to the heart of the city with utmost dispatch. The same service is available for outgoing passengers, the limousines leaving the downtown ticket office and principal hotels in time to catch the planes. The service is operated by private concerns, but must satisfy rigid qualifications stipulated by the air lines.

TRAFFIC OTHER THAN TRANSPORT

Itinerant Flying Increases:

Taking advantage of improved flying facilities along the government airways, itinerant flying has increased considerably during the past fiscal year. The increase has been brought about also by improvement in airplane design, tending toward both comfort and efficiency. Four-passenger cabin planes are becoming of more common use, but those of larger and smaller capacity are likewise increasing in number. Department of Commerce statistics show that at the close of the fiscal year 7,403 licensed airplanes were in use in the United States and territories, an increase of 431 over the previous year.

Coming closer to home we find some interesting figures for the State of California alone. It's foremost position in the field of itinerant flying is apparent when we consider that at the close of the fiscal year this State had more aircraft, more pilots, and more airports that any state in the Union. The figures are as follows:

	Number of Aircraft (Licensed & Unlicensed)	Number of Pilots	Number of Airports
CALIFORNIA	932	2,809	192
Nearest Rival	907 (N.Y.)	1,505 (N.Y.)	135 (Tex.)
Total for U. S. & Territories	9,167	15,204	2,402
Percent of total represented by California	10%	18%	8%

Considering these figures it is but reasonable to assume that itinerant flying in and out of San Francisco Airport will continue to increase, perhaps even at a faster rate than heretofore. The City's prominent position in the fields of finance, business, and recreational amusement, together with the up-to-date facilities of its improved air terminal must needs attract air travelers in privately owned craft from all sections of the State, as well as from states beyond. Flights "to the City" will become commonplace, and San Francisco will welcome these visitors at its municipal Airport.

During the past fiscal year pilots from all parts of the United States, and occasionally those from foreign countries, have stopped at San Francisco Airport. All have been deeply impressed by the development project under way, and their satisfaction will undoubtedly be reflected in widespread popularity of this field.

As a result of the increase in transient activity and the number of permanent tenants at the field, hangar space has become somewhat cramped. Development plans, however, call for the construction of additional hangars, and it is hoped that at least one may be available before the close of the coming fiscal year.

LOCAL FLYING

Permanently based airplanes at San Francisco Airport on June 30, 1936, numbered 41. Classifying these in groups according to the purposes for which they are used we have the following:

25—Private use only
*6—Flying School training
5—Airplane dealers' demonstrators
†3—Charter trips and scenic flights
1—Flying Club
1—Skywriter

41—Total

*One additional plane classed under "dealers" below also used for training flights.

†Two additional planes classed under "dealers" above also used for charter work.

Planes for Private Use:

Some of the planes listed with the private group are the property of business firms in San Francisco and are used by company officials on business trips. These, however, number only five or six, and the balance of the privately owned group are flown almost solely for pleasure purposes or for "commuting" to and from outlying ranches and resorts.

Flying Schools:

Five flying schools are in operation at the Airport. Summit Flying School and Chieftan Air Service operate "Fleet" training planes; Peninsula Flying Service uses a "Waco" model; Marshall George uses a low-wing "Kinner" monoplane and a cabin "Porterfield." Con-Walt Flying School has replaced Moreau Flying Service at this field and operates two cabin training ships, a "Parakeet" and a "Rearwin." Not only do students use these various ships while learning to fly but continue to do so after acquiring their licenses, as the schools rent their planes to licensed pilots.

Charter and Scenic Flights:

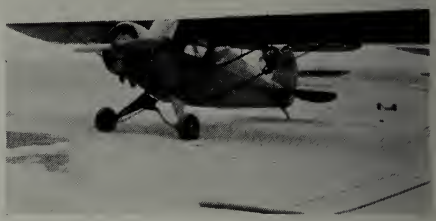
The popularity of scenic flights around the Bay area continues, and will undoubtedly increase as the Bridges and shoals Exposition site approach completion. It is well known that there is hardly a spot in the world of more natural and cultural beauty than San Francisco and its immediate environs. To see this panorama of grandeur all at one time from the vantage point of some two thousand or more feet in the air is indeed impressive.

At least five and at times a larger number of planes are available for charter service at the Airport, ready to carry passengers to any section of the United States or adjacent countries. Rates for such flights are based upon mileage flown and layover time at the destination. The price is no higher for taking a full load of passengers than for taking one, and round trip fares are the same as one-way, since the plane must return to its base. Thus when several are in the party, the cost of chartering a plane is very reasonable per person, and smaller type planes may be used when only one or two desire passage.

Airplane Agencies:

Seven airplane agencies are established at San Francisco Airport. The "Waco" company is represented by Northern California Waco Distributors, Inc.,

"KINNER"



"PORTERFIELD"

"STINSON"

"BELLANCA"

"BEECHCRAFT"

"WACO"

TYPES OF PLANES SOLD AT SAN FRANCISCO AIRPORT

with territory of Northern California and Nevada. Mouton & Six are representatives for two factories, the "Beechcraft" with territory of northern California, Nevada, Oregon, Washington and Idaho, and the "Douglas" with territory of northern California. The "Bellanca" company is represented by Frank Fuller, with territory of northern California. Marshall George is northern California representative for "Porterfield" planes, and is "Kinner" representative in the Bay area. The "Stinson" agency for northern California and Nevada is managed by Jennison Heaton.

In addition to their airplane agencies Mouton & Six are dealers for RCA radio equipment.

Flying Club:

One plane based at the Airport is owned by the San Francisco Flying Club. This organization is made up of licensed fliers who have banded themselves together and purchased an airplane, the upkeep of which is paid for by each member in accordance with the amount of time he uses the plane. Meetings are held regularly at which interesting discussions take place concerning current aviation developments.

Skywriter:

The only plane equipped for skywriting in the western part of the United States is based at San Francisco Airport. Thor Polson, veteran of over twenty-five years flying activity, owns and operates the craft. He is frequently seen over cities and large assemblages of people printing smoke signs in the air, some 12,000 to 15,000 feet above the ground. Such signs hold a unique place in the field of advertising.

TENANTS OTHER THAN AIRPLANE OWNERS

Pacific Airmotive Corporation:

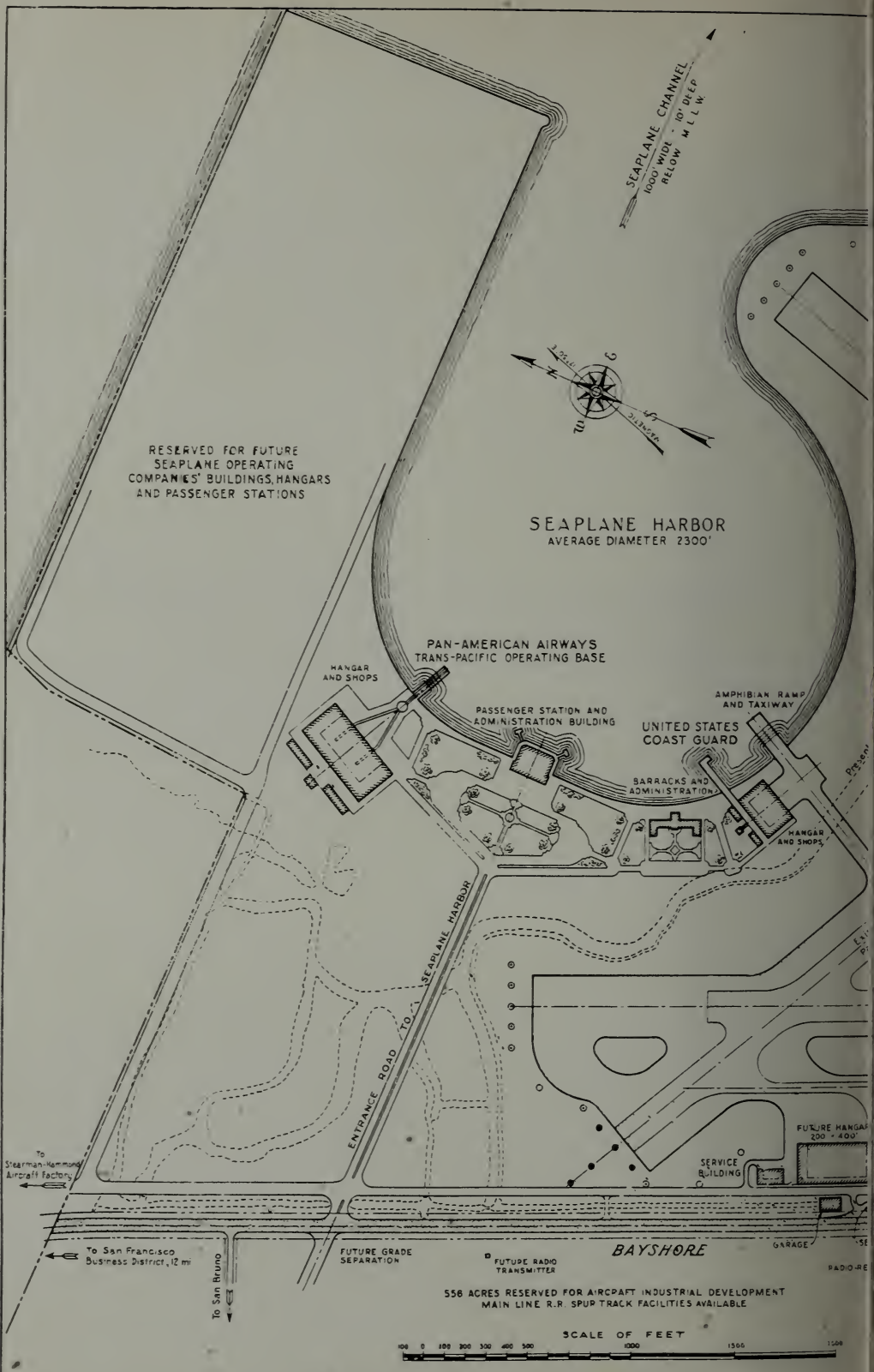
Pacific Airmotive Corporation, the west coast's leading aircraft sales and service organization, which moved its San Francisco Bay area base to this field in March 1935, has found it necessary to acquire more floor space for carrying on its work. In addition to occupying the large machine shop building it was found necessary during the past year to occupy the north half of Hangar No. 4.

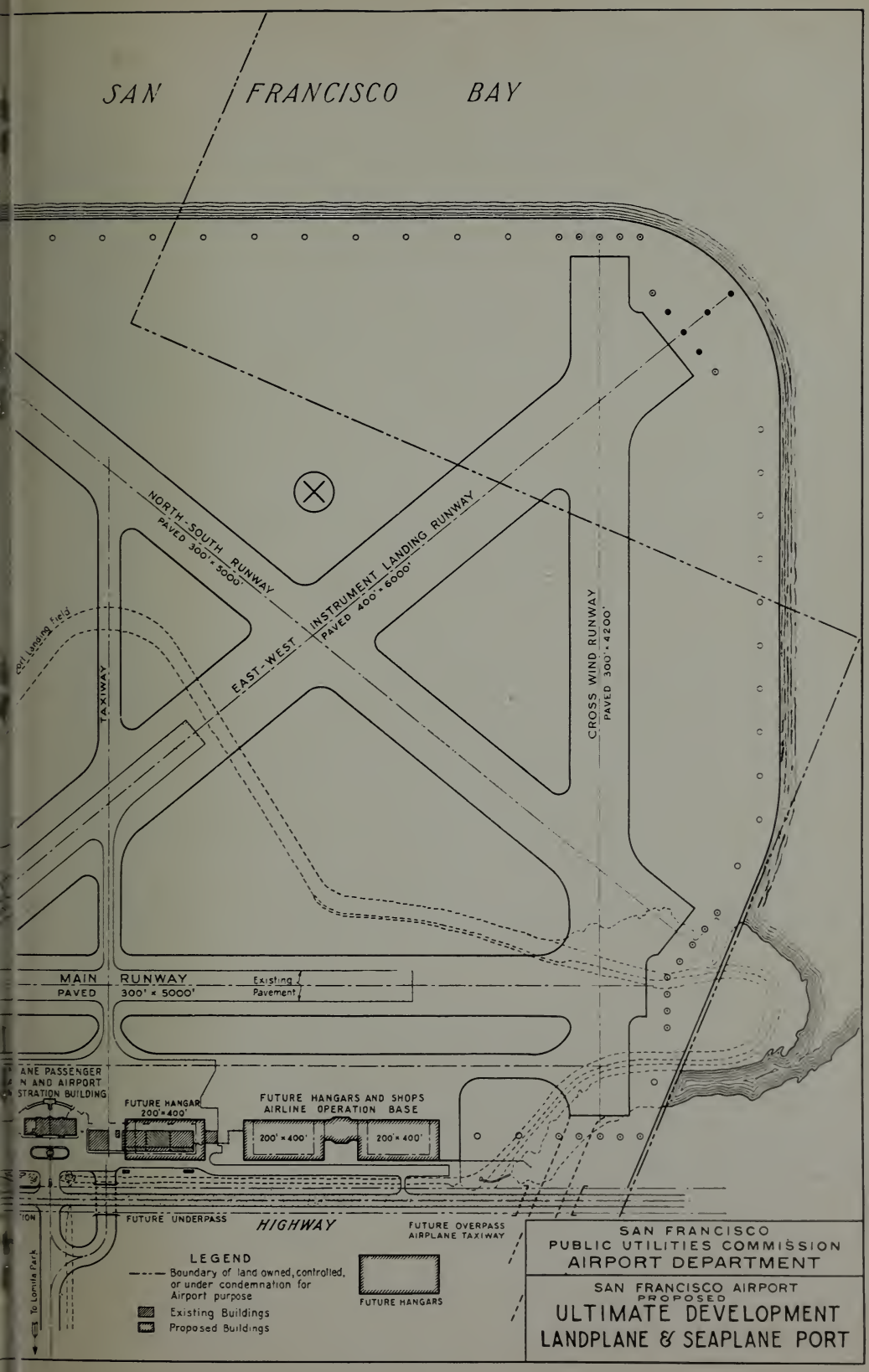
This Corporation, established in 1926, is exclusive representative on the west coast for the leading aircraft concerns in the United States. To completely serve the airplane owner a stock of over 14,000 individual items is carried in its supplies department. Sales and service of engine and propellers are included with its aircraft supplies. An investment of over $100,000 is represented in this stock.

Its repair department holds a Department of Commerce Approved Repair Station Certificate No. 88. Repair work on all aircraft features inspected by the Bureau of Air Commerce is permitted by this Certificate.

United Air Lines Ticket and Reservations Offices:

The personnel of United Air Lines at San Francisco Airport has been augmented considerably during the year. Traffic men have increased in number due to the increases in passengers, mail and express cargo. An additional departmental office has been established at the field—that of the Reservations Department, formerly located in San Francisco. The move was made to centralize operations and bring about closer cooperation between the work of the men handling reservations and the traffic men at the field.


SEAPLANE CHANNEL
1000' WIDE - 10' DEEP
BELOW M.L.W.
RESERVED FOR FUTURE
SEAPLANE OPERATING
COMPANIES' BUILDINGS, HANGARS
AND PASSENGER STATIONS
SEAPLANE HARBOR
AVERAGE DIAMETER 2300'
PAN-AMERICAN AIRWAYS
TRANS-PACIFIC OPERATING BASE
HANGAR
AND SHOPS
PASSENGER STATION AND
ADMINISTRATION BUILDING
AMPHIBIAN RAMP
AND TAXIWAY
UNITED STATES
COAST GUARD
BARRACKS AND
ADMINISTRATION
HANGAR
AND SHOPS
SEAPLANE HARBOR
ENTRANCE ROAD TO
SERVICE
BUILDING
FUTURE HANGAR
200 x 400'
To
Stearman-Hammond
Aircraft Factory
To San Francisco
Business District, 12 mi
To San Bruno
FUTURE GRADE
SEPARATION
FUTURE RADIO
TRANSMITTER
BAYSHORE
GARAGE
556 ACRES RESERVED FOR AIRCRAFT INDUSTRIAL DEVELOPMENT
MAIN LINE R.R. SPUR TRACK FACILITIES AVAILABLE
SCALE OF FEET
100 0 100 200 300 400 500 1000 1500


SAN FRANCISCO BAY
NORTH-SOUTH RUNWAY
PAVED 300' × 5000'
EAST-WEST INSTRUMENT LANDING RUNWAY
PAVED 400' × 6000'
CROSS WIND RUNWAY
PAVED 300' × 4200'
TAXIWAY
MAIN RUNWAY
PAVED 300' × 5000'
Existing Pavement
FUTURE HANGAR 200' × 400'
FUTURE HANGARS AND SHOPS AIRLINE OPERATION BASE
200' × 400'
200' × 400'
FUTURE UNDERPASS
HIGHWAY
FUTURE OVERPASS AIRPLANE TAXIWAY
To Lomita Park
LEGEND
Boundary of land owned, controlled, or under condemnation for Airport purpose
Existing Buildings
Proposed Buildings
FUTURE HANGARS
SAN FRANCISCO
PUBLIC UTILITIES COMMISSION
AIRPORT DEPARTMENT
SAN FRANCISCO AIRPORT
PROPOSED
ULTIMATE DEVELOPMENT
LANDPLANE & SEAPLANE PORT

Airdrome Transport Company:

The limousine service which covers all arrivals and departures of United Air Lines planes in the San Francisco and Los Angeles areas is operated by Airdrome Transport Company, with Bay area headquarters at San Francisco Airport. An office is maintained in the Airport Administration building. This company also has limousines ready for special service at any hour of the day or night. Thus, transient as well as transport operators are assured of prompt service.

Telegraphic Service:

The Western Union teletype at San Francisco Airport prior to the past fiscal year had been handled both by Airport and airline personnel. Postal Telegraph service was handled by telephone only. During the past fiscal year the large increases in traffic made it imperative that this service be improved, and today both Western Union and Postal Telegraph have teletypes in the Administration building, and each have a representative on duty to handle traffic.

Airplane Mechanics and Oil Companies:

A group of licensed airplane mechanics are available at the Airport for repair work on itinerant and permanently based aircraft and engines. Some of these men are employed regularly by airplane owners at the field, their duty being to keep the craft in good mechanical condition at all times.

Five oil companies maintain fuel supplies at the field.

ENGINEERING AND CONSTRUCTION

The past two years has witnessed the greatest construction activity since the establishment of the Airport. The construction completed, now under way, and being planned for immediate future, will make San Francisco Airport the equal of any in the United States, and in addition will provide a modern seaplane port capable of handling the largest seaplanes proposed. The landing field has been enlarged, drainage of entire landing field improved, pavement of the two principal run-ways completed, the field lighting system modernized and improved, new and adequate water supply mains connecting to the Water Department system placed in service, a modern new administration building constructed, 160 acres of tideland property acquired and the basic land areas for the seaplane port development reclaimed.

The total cost of the construction work accomplished during the year amounts to $1,184,532.86 and is shown in detail in the following table. The largest portion of the work was financed from Federal funds, with comparatively little direct cost to the City.

Landing Field Extension:

A new area of approximately 38 acres was made available for landing field use by the completion of the landing field extension on the easterly side of the airport. This improvement about doubles the available length of the runways in the direction of the prevailing wind. During the fiscal year, 256,013 cubic yards of earth and rock were placed under Airport Contract No. 34 in the field area enclosed within the levee previously constructed, thus completing the reclamation of this area of tidelands. The earth and rock were hauled by truck, mostly from a quarry about three miles distant in South San Francisco. The field area was surfaced with rock, leveled, and two runways paved.

A lighting system for the landing field extension was constructed under Airport Contract No. 36. This lighting includes 15 modern new boundary light

SAN FRANCISCO AIRPORT CURRENT CONTRACT AND PROJECT DATA

FISCAL YEAR 1935-1936

Cont. or Proj. No.	Contract or Project Designation	Contractor	Contract Commenced	Time Allowed in days	Date of Completion	Amount of Bid or Estimate	Amount Paid or Expended During Fiscal Year	Fund
34	Field fill for extension of landing field (PWA Proj. 1538-3)	Piombo Bros. & Company	6/29/35	180	11/19/35	$123,880.00	$132,514.38	1933 Airport Bonds
36	Lighting system for Landing Field Extn. (PWA Proj. 1538-4)	H. S. Tittle Company	2/3/36	75	5/1/36	5,564.00	5,646.00	1933 Airport Bonds
37	Addition to Hangars Nos. 3 and 4 (PWA Proj. 1132-10A)	Empire Const. Company	2/3/36	120	6/12/36	16,886.00	17,128.59	Utilities Improvement
38	Administration Bldg. (PWA Proj. 1132-10B)	Reed & Reed	6/24/36	174	Not Complete	141,799.00	....	Utilities Improvement
SERA	Sewer and Appurtenances and Miscl. work (SERA Proj. SM40-B15-164)	Day labor Construction	4/29/35	90	8/29/35	22,873.99	1,916.85 8,514.84	City Federal
WPA	General Improvem't of Airport (WPA Proj. 1727)	Day labor Construction	12/3/35	365	Not Complete	1,717,982.00*	22,439.68* 996,372.52	City Federal
TOTAL VALUE OF WORKS CONSTRUCTED DURING YEAR							$1,184,532.86	

* These figures are exclusive of $22,000 furnished by the Chamber of Commerce for the purchase of 160 acres of tidelands for seaplane port construction, and $105,000 for the purchase of land from the Mills Estate for the airport.

SAN FRANCISCO AIRPORT—ADMINISTRATION BUILDING—SOUTH END OF WAITING ROOM FROM BALCONY.

cones equipped with prismatic globes, 15 obstruction lights mounted on top of the new levee, two modern Sperry AGA-BBT, 90 degree spread, field floodlights, each having four 1500 watt incandescent lamps, a concrete transformer vault, and necessary conduit, cable, transformers and wiring.

Addition to Hangars Nos. 3 and 4:

A one-story shop and office addition to the westerly side of Hangars 3 and 4 was constructed. This building has long been needed to provide necessary shops, offices and toilets for the tenants of these hangars. The building is one story, approximately 20x240 feet in plan, of timber frame construction with composition roof, stucco exterior, metal lath and plaster interior, concrete slab and girder floor, and is founded on timber piling averaging about 65 feet in length. The piling for this structure was driven two years ago under the C.W.A. project. Five shops, six offices and four toilets are housed in the building.

New Administration Building:

Plans and specifications were prepared, contract awarded to Reed & Reed at a price of $141,799, and construction started for a new Administration Building last year. This building is approximately 86x206 feet in plan, of Spanish architecture, two stories in height with a four-story tower. It houses the main waiting room, baggage, express and mail handling facilities, airline offices, administrative offices, restaurant facilities, private offices for rental, weather bureau offices, Department of Commerce offices, airway control offices, and field control tower. The building is primarily of reinforced concrete construction and is well finished in keeping with the requirements of an airline terminal for a metropolitan city. The design contemplates the addition of a future wing to the north about 86x66 feet in plan. The new building is located on the original site of the temporary administration building.

New Sewage Plant Provided:

The old temporary sewage disposal system of small wooden septic tanks was removed and a new system completed under S.E.R.A. project SM40-B15-164. The new system consists of cast iron pipe, gravity sanitary collecting sewers discharging into a concrete sump, twin vertical centrifugal sewage pumps each having a capacity of 170 gallons per minute, and a cast iron outfall sewer delivering the wastes into tidal water. The nuisances due to the discharging of imperfectly treated sewage into the drainage canal adjacent to the airport buildings, have thus been removed.

The sewage pumphouse, located over the sump, also houses a transformer vault and public comfort stations for men and women.

Works Progress Administration Project:

On December 3, 1936, construction work was started on a $1,844,982 Works Progress Administration Project for the general improvement of the land and seaplane ports at San Francisco Airport. Construction operations under WPA are carried on much as was done under the old C.W.A. and S.E.R.A. projects. The sponsor bears all responsibility for the engineering, administration and supervision of the project, prepares plans, specifications and bills of materials, and supervises the construction carried on by relief labor furnished and paid for by the Federal Government. The Federal Government also purchases most of the materials on the basis of bills of material and specifications furnished by the

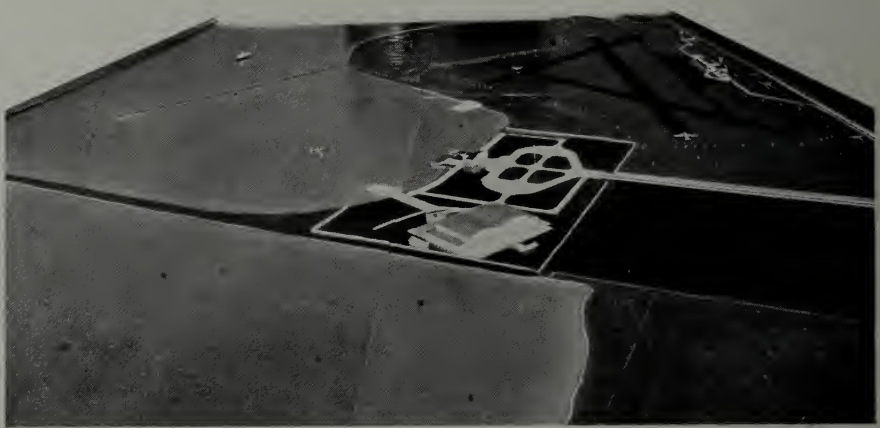
City. On this project the estimated cost of the work is divided between the City and the Federal Government, as shown below:

Item	Federal Funds	Sponsor's Funds	Total
Labor, including Engineering and Superintendence	$ 969,333	$ 13,000	$ 982,333
Materials and Supplies	241,676	....	241,676
Equipment Rentals	449,973	11,000	460,973
Other direct costs	15,000	18,000	33,000
Land Purchases	....	127,000	127,000
Total	$1,675,982	$169,000	$1,844,982

Of the funds furnished by the Sponsor, $22,000 was donated by the San Francisco Chamber of Commerce for acquisition of tidelands for construction of the seaplane port, $105,000 was for the annual purchase of 111.25 acres of airport land from the Mills Estate, and approximately $27,000 is represented by rental charges made to the project for airport equipment and facilities to be used on the work.

The project includes the following principal items:

1. Runway and taxiway pavements, 1,057,000 sq. ft.
2. Runway, taxiway and field drains, 45,000 lin. ft.
3. Miscellaneous drainage, including a new tide gate with four 36″ discharge pipes, a double 6′ x 4′ concrete culvert for the seaplane port entrance road, and improvement of the main drainage canals.
4. Subgrade excavation and releveling flying field, 33,000 cu. yds.
5. Field lighting, including four concrete transformer vaults, two new field floodlight units, 46 new boundary light cones and fixtures, 25,000 lin. ft. of main 3″ conduit, 40,525 lin. ft. of main underground power and control cable, a reinforced concrete field lighting terminal building approximately 26 x 36 feet in plan, 13 transformers, and necessary control equipment.
6. Main water service, including 5,500 lin. ft. of 12″, 700 lin. ft. of 8″ and 560



MODEL SHOWING ULTIMATE LAND AND SEAPLANE BASE DEVELOPMENT

PAN-AMERICAN "CLIPPER" OVER GOLDEN GATE
These great trans-Pacific ships will soon be based at San Francisco Airport.

lin. ft. of 6" cast iron pipe, 7 standard fire hydrants, and necessary valves and fittings.

7. Water, gas, telephone, sewer and electric services to new buildings.
8. Roadway, curbs, and walks for new buildings.
9. Sewer extensions.
10. Miscellaneous construction.
11. Dredging for levee construction, 200,000 cu. yds.
12. Earth and rock fill for seaplane port construction, 650,000 cu. yds.

The construction of this project is now virtually complete. Construction on the seaplane port portion of the project has been pushed so as to facilitate early construction of the remainder of the seaplane port development.

The improvement to the electric system will enable the airport to purchase all energy needed on one meter, thus making applicable more favorable rates for electric energy used.

The new water main connects the airport to the City's 44" Crystal Springs pipe line at El Camino Real and San Felipe Avenue in San Bruno, with a cross connection to the City's 44" San Andres pipe line. A twelve-inch main service pipe to the airport is provided, with 8-inch and 6-inch branch mains within the airport. The new service replaces the old depreciated 3-inch wrought iron pipe connecting to the San Bruno water supply system, and gives the airport an adequate supply of pure water for domestic purposes as well as providing water supply for fire protection that has not been available in the past.

Seaplane Port:

Preliminary plans for a complete seaplane port development were drawn

and a War Department permit for its construction secured. The plan contemplates the construction of an approach channel 1,000 feet wide and about 6,000 feet long, dredged to a depth of 10 feet below mean lower low water, a harbor approximately one-half mile in diameter, dredged to a depth of 10 feet below mean lower low water, seawalls, breakwater, reclamation of land areas for shore facilities involving approximately 1,000,000 cubic yards of earth and rock fill, marine railway, piers, terminal building, hangars, and all necessary utilities. At the close of the year approximately 600,000 cubic yards of earth and rock fill for the seawalls, breakwaters and reclamation of port facility land areas, has been placed under WPA Project 1727; the necessary rearrangement of the main airport drainage system constructed, which involved a new main canal, tide gate and seaplane port entrance road culvert; and 160 acres of tidelands acquired to provide for the port construction.

Engineering Work:

All engineering and architectural work for the airport was done by the Bureau of Engineering of the Public Utilities Commission of which Mr. L. T. McAfee is Chief Engineer, Mr. L. W. Stocker is Chief Civil Engineer, and Messrs. George D. Burr and A. J. Wehner are respectively designing engineer and construction engineer for the airport work.

WEATHER DEPARTMENT

How is the weather to Salt Lake? What altitude is best for a favorable wind? What time will the line squall pass the high Sierras? When will the fog break at Los Angeles? These inquiries about weather and many more of a similar nature are received regularly at the San Francisco Airport Meteorological office. Over telephone and at desk, weather information is being dispensed daily by the meteorologists on duty, as the teletypewriter service of the Department of Commerce flashes reports from weather stations throughout the United States.

Hourly Weather Sequences:

Teletype weather transmissions are run on exact schedules, beginning at 41 minutes past each hour. Some 20 stations between Seattle and San Francisco, 13 between San Francisco and San Diego, and 15 between San Francisco and Salt Lake City are received hourly. At 6-hourly intervals some 150 reports are received from off-airway stations in the west and from the eastern airways. The San Francisco Airport weather observation is of course a part of these sequences, being transmitted via government teletype to all points along the line.

Reports Broadcast by Radio:

Department of Commerce radio stations, located near the principal air terminals, broadcast the weather sequences as soon as the collection is complete. Up to the minute weather between the hourly sequences is assured by a strict provision whereby "Special" observations are dispatched immediately from any station at which weather changes of a material nature occur, and these too are broadcast as soon as received.

Airway Forecasts:

Obviously a pilot contemplating a flight is not interested merely in the weather existing at the time of his departure, but rather in the weather that will prevail as he passes along his route. To provide this information "Airway Forecasts" are received from the district Weather Bureau forecast center every six hours. Although the forecasts are issued at 6-hourly intervals, they predict the weather for the ensuing eight hours.

AIRWAY MAP OF WORLD SHOWING NEW TRANS-PACIFIC ROUTE. SAN FRANCISCO AIRPORT WILL BE UNITED STATES TERMINAL FOR THIS SERVICE.

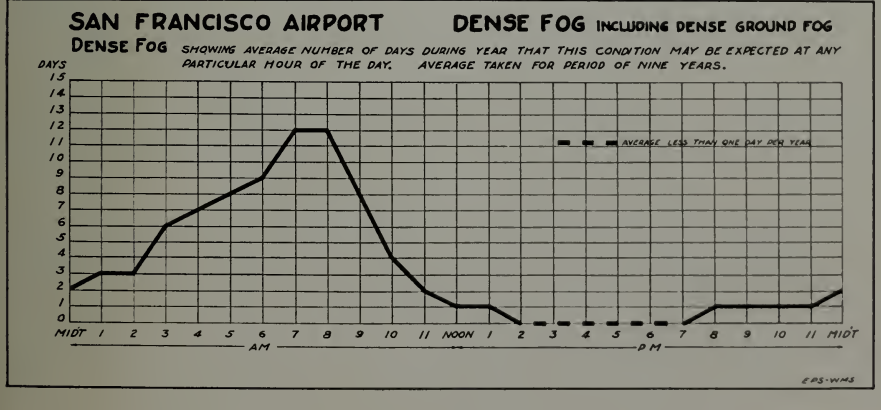
Another group of forecasts, issued not merely for aviation interests but for agricultural and general public needs as well, is received twice daily at 6 a. m. and p. m. These predictions are for a period of 36 hours in advance and are of a general nature, covering each state in the west or major subdivision thereof.

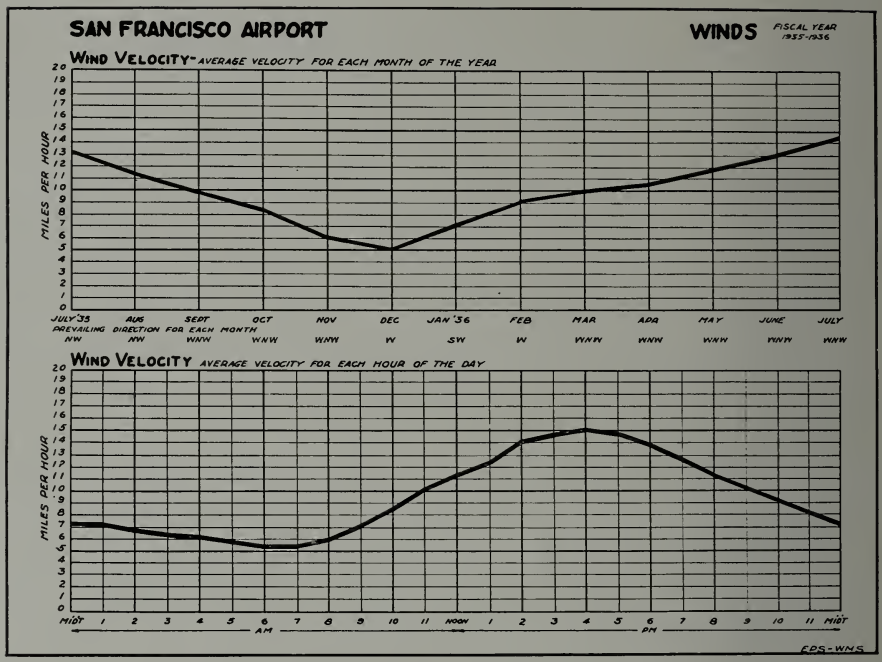
Extensive Weather Map Prepared:

To facilitate the interpretation of weather reports and forecasts and to be able to discuss intelligently the prevailing conditions with pilots, a large weather map is prepared each morning in the Airport Meteorological Office, showing conditions over the whole of the United States, Canada, Alaska and the north Pacific Ocean. Air mass movements are readily followed with the aid of this synoptic chart, and a "picture" of the atmosphere within a radius of some 1,000 to 3,000 miles is thus provided.

Upper Air Wind Observations:

Clear skies do not always mean fair sailing for transport and transient air-


SAN FRANCISCO AIRPORT
DENSE FOG INCLUDING DENSE GROUND FOG
DENSE FOG SHOWING AVERAGE NUMBER OF DAYS DURING YEAR THAT THIS CONDITION MAY BE EXPECTED AT ANY PARTICULAR HOUR OF THE DAY. AVERAGE TAKEN FOR PERIOD OF NINE YEARS.
DAYS
AVERAGE LESS THAN ONE DAY PER YEAR
MIDT 1 2 3 4 5 6 7 8 9 10 11 NOON 1 2 3 4 5 6 7 8 9 10 11 MIDT
AM
PM
EPS-WMS


SAN FRANCISCO AIRPORT
WINDS
FISCAL YEAR 1935-1936
WIND VELOCITY - AVERAGE VELOCITY FOR EACH MONTH OF THE YEAR
MILES PER HOUR
JULY '35 AUG SEPT OCT NOV DEC JAN '36 FEB MAR APR MAY JUNE JULY
PREVAILING DIRECTION FOR EACH MONTH
NW NW WNW WNW WNW W SW W WNW WNW WNW WNW WNW
WIND VELOCITY AVERAGE VELOCITY FOR EACH HOUR OF THE DAY
MILES PER HOUR
MIDT 1 2 3 4 5 6 7 8 9 10 11 NOON 1 2 3 4 5 6 7 8 9 10 11 MIDT
AM
PM
EDS-WMS

craft. The wind element is a predominating factor in every flight. Head winds mean delays, and tail winds result in a saving of time and expense. Frequently airplanes traveling in opposite directions over the same airway at the same time may each be favored with a tail wind. The explanation of this peculiar circumstance lies in the fact that the planes are at different levels, and winds at one altitude are no sure indications of winds at other altitudes.

To solve the wind problem, hydrogen filled balloons, measuring some 30 inches in diameter when inflated, are released every six hours at a large number of weather stations throughout the United States and also from vessels on the ocean. The balloon rises 600 feet a minute and drifts with the wind. Its course is followed with the aid of a telescopic instrument called a "theodolite." Angular readings on its position are taken each minute, from which readings the direction and force of the winds at the various flying levels may be quickly calculated.

San Francisco Airport has been an authorized Weather Bureau balloon station since the summer of 1927. Its reports are transmitted via teletype to all points interested and are broadcast by the local Department of Commerce radio station.

Upper Air Temperatures, Pressure, and Moisture:

Reports on the vertical structure of the atmosphere as regards temperature, pressure, and moisture content are now received from some twenty stations in the United States. Airplanes to which self-recording instruments are attached ascend daily to a height of 16,000 feet, gathering the valuable data. The pilot is in constant communication with the ground station via radio, and reports such additional information as the thickness of cloud layers, altitudes of rain, snow, and ice, and the extent of turbulence.

Teletype Traffic Varied:

Teletype traffic is for the most part weather data, but other types of information are likewise transmitted. Messages dealing with changes or interruptions in the operation of navigational aids such as radio ranges and broadcasts, beacon and boundary lights, and field obstructions are sent to all concerned along the lines. Emergency messages of any nature are given priority.

"PX" or movement messages are sent on itinerant aircraft at the pilot's request, and the plane's flight closely followed until arrival at its destination.

In general it may be said that any information tending toward the safe and efficient operation of aircraft is acceptable traffic at any station.

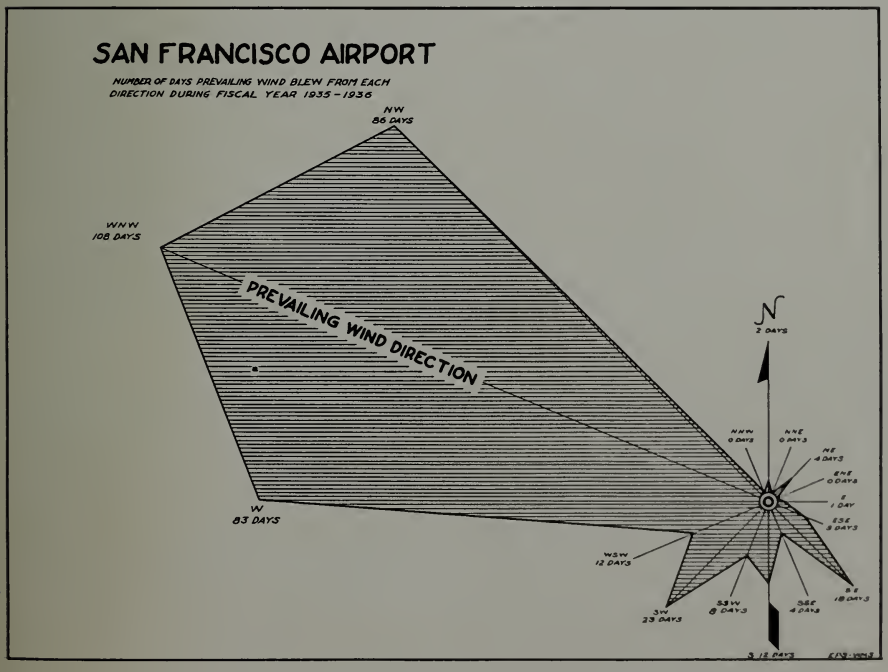
Weather Instruments:

Perhaps the most important weather instrument installed in the Meteorological Office is the Wind Indicating and Recording System. It is of ideal design for airport use in that a continuous record of wind direction and speed is provided. Instantaneous fluctuations are recorded and thus the degree of gustiness, which is an all important factor in the landing and take-off of aircraft, is at all times indicated. The system operates electrically, being actuated by self-synchronous motors.

Other weather instruments include a whirling cup anemometer (used as a check on the regular wind recorder), a mercurial barometer, barograph, psychrometer, maximum and minimum thermometers, rain gage, ceiling projector and indicator, and equipment for inflating and following balloons, both those released for determining ceilings and those used for upper air wind observations.

Weather Records:

Weather records are kept in tabulated form at the Airport station and



WEATHER DATA

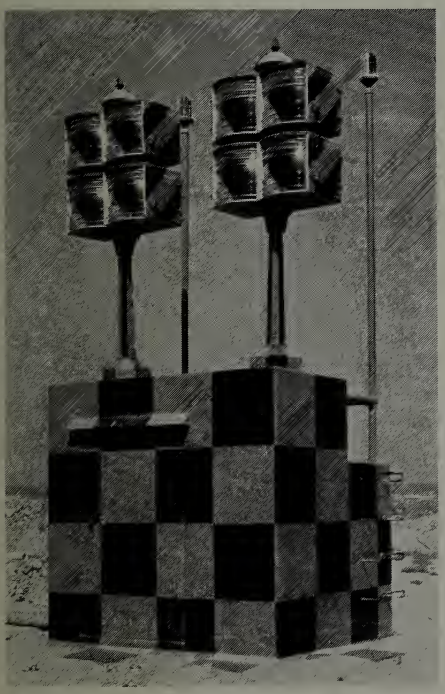
Fiscal Year 1935-36

	TEMPERATURES					PRECIPITATION		WIND		NUMBER OF DAYS			
	Average Daily Maximum	Average Daily Minimum	Average	Absolute Highest	Absolute Lowest	Total	Greatest in 24 Hours	Prevailing Direction	Average Velocity	Clear	Partly Cloudy	Cloudy	Rain (.01 or more)
1935													
July	69.0	50.1	59.5	80	45	Trace	Trace	NW	13.3	22	6	3	0
August	69.0	49.3	59.2	92	42	0.22	0.21	NW	11.6	20	8	3	2
September	68.0	51.1	59.6	86	45	Trace	Trace	WNW	9.9	9	16	5	0
October	67.9	48.2	58.1	79	36	1.47	0.53	WNW	8.5	17	11	3	7
November	61.2	39.8	50.5	71	32	0.73	0.52	WNW	6.2	15	8	7	3
December	58.2	39.7	48.9	65	31	1.98	0.97	W	5.1	12	8	11	8
1936													
January	58.8	43.5	51.1	68	34	3.25	1.21	SW	7.3	8	5	18	11
February	58.3	43.6	50.9	71	33	8.55	1.58	W	9.2	9	8	12	18
March	63.5	44.2	53.8	77	39	0.86	0.46	WNW	10.0	14	11	6	4
April	65.5	46.7	56.1	86	37	1.20	0.82	WNW	10.6	12	11	7	5
May	69.6	50.2	59.9	85	44	0.22	0.16	WNW	11.8	16	13	2	4
June	70.0	53.6	61.8	82	46	0.11	0.05	WNW	13.0	18	6	6	3
Fiscal Year '35-'36	64.9	46.7	55.8	92	31	18.59	1.58	WNW	9.7	172	111	83	65

copies sent monthly to the United States Weather Bureau headquarters. In addition to being of use to the Airport management and engineers, these records are occasionally called for by the courts, newspapers, civic and industrial organizations, and private individuals.

Although primarily an "Airway Station" of the United States Weather Bureau, the local Meteorological Office is also a "Cooperative Station" of the Bureau. A tabulated report is mailed monthly to the Climatological Division and a morning weather observation is published daily on the Weather Map mailed from San Francisco to numerous organizations and private subscribers.

AIRWAY AND AIRPORT TRAFFIC CONTROL



NEW FLOOD LIGHTS AID NIGHT FLYING

As a result of the steady increase in air traffic along established routes, and the congestion that might normally be expected at terminals where several airways converge, the Bureau of Air Commerce is formulating more rigid traffic rules and establishing "Traffic Control Stations" at strategic points. At the close of the fiscal year three such stations are in operation—at Newark, N. J., Chicago, Ill., and Cleveland, Ohio. They are being conducted on a cooperative basis by the Bureau of Air Commerce and the airlines, but early in July, 1936, they will become the sole responsibility of the Bureau. In the near future stations will be established at San Francisco and Los Angeles, Calif., Washington, D. C., Detroit, Mich, and Pittsburgh, Pa.

Government Station and Airport to Cooperate:

For the past three years San Francisco Airport has controlled by radiotelephone the landings and takeoffs of transport and other radio equipped aircraft at the field. The Bureau of Air Commerce traffic control station to be established will in no way interfere with the work of the Airport tower, for the Bureau facility will control traffic along the airways up to the immediate vicinity of the terminal, after which the planes will be under the control of the Airport tower. Close cooperation between the Commerce and Airport stations will of course be maintained, in order that the Airport personnel may be informed of all airplane movements in the vicinity, and the Bureau station may be advised of flight completions and plans for flight inauguration.

Traffic control is most urgently needed during periods of thick weather, when planes are forced to fly by instrument and radio. A safe distance between them,

either vertically, or horizontally or both, must be assured to prevent the possibility of collision. However, the work of the Bureau of Air Commerce control station is not confined to periods of bad weather, for even under clear skies no chances are taken that might result in an accident. The station operates during all periods of the day and night when air traffic warrants supervision.

New Air Traffic Rules:

Pilots whose planes are not equipped with two-way radio are prohibited by a Bureau of Air Commerce ruling from flying through clouds on a civil airway, that is when weather reports indicate that a condition of "overcast" or "broken clouds" prevails along the route. Pilots whose planes are equipped with twoway radio must have obtained a "non-scheduled instrument rating," qualifying them to navigate by instrument and radio alone. Furthermore, pilots of itinerant craft must submit a "flight plan" to the Bureau's traffic control station, indicating the proposed time of departure, proposed cruising altitude, type of equipment, and estimated flying time to destination. Still another rule demands that all planes flying the civil airways must remain at specified levels, that is, those traveling westward (180° to 359°, inclusive) must fly at an odd-thousand foot level (such as 1,000, 3,000, 5,000, etc.) and those traveling eastward (0° to 179° inclusive) must fly at an even-thousand foot level (such as 2,000, 4,000, 6,000, etc.). All planes must fly to the right of the center line of the airway. To cross the airway a pilot must seek a 500 foot level in between the 1,000 foot levels (such as 1,500, 2,500, 3,500, etc.).

Airplane Movements Mapped:

As a result of these newly established rules each Bureau of Air Commerce traffic control station knows exactly the location of every plane flying the airways in the district. Small wooden markers representing airplanes are moved about on a large map of the district, thus giving a complete picture of plane movements. On large blackboards tabulations are made of data received by radio and telephone. A circular slide rule is used to compute speeds, taking into consideration the upper air wind reports as well as the plane's cruising speed. The controllers on duty predict by computation the arrival of the various planes over certain fixed points, such as landmarks and radio markers. As a plane actually passes these points the pilot reports in by radio and the controller makes any correction necessary in his calculations, which by experience at the stations established has been found very small.

After approaching planes pass from the supervision of the Bureau traffic control station to that of the airport control tower they are brought in one by one, some having to circle the field until clearance is established and they are given permission to land. The pilot desiring to leave must contact the control tower while his plane is still on the apron, and ask permission to taxi out on the runway preparatory to take-off. Having received this permission he proceeds to the point of take-off and again calls the tower for final clearance. As the plane leaves the field the tower operator notifies the Bureau traffic control station of the departure, under whose supervision the plane's progress is guided as soon as he is a few miles out.

This Bureau of Air Commerce traffic control system will be welcomed in the San Francisco Bay area, and materially assist the local Airport control tower in the direction of our steadily increasing air traffic.

ACCIDENTS

TYPE OF BOUNDARY LIGHT

Air Transport:

During the past three fiscal years, for which period United Air Lines traffic figures at San Francisco Airport are available, landings and take-offs of these planes have numbered 42,664. Passengers on and off (excluding through passengers) have numbered 124,834. That safety measures have been a paramount consideration of the Airport management with regard to traffic control, and that United Air Lines have maintained a high degree of efficiency in this regard is attested to by the fact that not a single accident involving even minor injuries to passengers or personnel has occurred during that three year period. For the several months prior to this period, when United Air Lines service was becoming established at this field, the same perfect record holds true.

Local and Itinerant Flying:

During the past fiscal year the same high degree of safety in local and itinerant flying has been maintained as has characterized San Francisco Airport operations in former years. Although thousands of landings and take-offs were made, a large number of which were student flights, only one accident occurred which involved injuries to plane occupants. This accident did not occur on the field proper, but some half mile to the south on the tide flats. The pilot was alone and his injuries of such minor nature that he was again active on the field within about ten days.

Rigid traffic control is enforced by the Airport management and close cooperation with the Bureau of Air Commerce is maintained. The Bureau inspectors visit the Airport on specified days each month to give examinations for licenses, inspect aircraft, and to see that air regulations are being enforced. Pilots who violate rules are punished by fine or revocation of license, and aircraft found unfit for safe flying are "grounded."

PERSONNEL

The Airport personnel during the past fiscal year has been made up of a Manager, Mr. B. M. Doolin, an Assistant Manager, Harold S. Messersmith, a Meteorologist, Mr. E. P. Sullivan, a Meteorological Computer, a bookkeeper, an Airport maintenance man, an average of ten Airport attendants and a janitor.

Mr. A. R. Wild, formerly Assistant Manager of the Airport, passed away during the summer of 1936. Mr. Wild, or "Pop" as he was affectionately known to his many friends in the aviation industry, was a pioneer in all phases of the game.

He learned to fly in 1914, was a builder of wartime airplanes for the United States Army and was also a co-designer and builder of the first civilian airplane to span the Pacific.

His untiring enthusiasm and energy, given without stint to his work, played no small part in making San Francisco Airport one of the nation's finest air terminals; he will long be remembered by all.

Needless to say, all hands at a terminal airport must be of high caliber. To them is entrusted the handling of planes, merely one of which sometimes costs over $100,000. And more important still is the fact that upon their efficiency depends the safety of passengers and the care of cargo. That the Airport management has been careful to enforce rules for the handling of traffic and routine work around the field, and that members of the personnel have carefully followed these rules is shown by the splendid safety record mentioned under "Accidents" in this report, where it is indicated that 42,664 landings and take-offs were made in the past three years by United Air Lines at this field and 124,834 passengers on and off (excluding through passengers) were handled without a single injury, even of minor nature.

The management, meteorological personnel and attendants all have Bureau of Air Commerce radio licenses, permitting them to operate the Airport's radio transmitter in the direction of traffic. Six men are licensed "Airway Observers" under the United States Weather Bureau, taking and sending weather observations over the national teletype lines. Weather observations at a terminal field where arrivals of transport planes are frequent, demand continuous and careful watch on the part of the weather men on duty, and good judgment must be exercised regarding the pilot's problems. The many rules and regulations issued by the United States Weather Bureau governing weather observational work must be thoroughly learned by these observers, and the frequent changes in regulations promptly put into effect. The men are subject to examination at any time that a representative of the Weather Bureau may see fit to visit the station.

Despite the substantial increases in traffic described elsewhere in this report, no additional personnel has been put on the payroll, except during the period when vacations are in progress, when temporary relief must be secured.

RED CROSS STATION AT AIRPORT

Cooperating with the American Red Cross in its program of establishing First Aid Stations at strategic points along the highways of the United States, the management of San Francisco Airport in September, 1935, entered into an agreement with San Francisco Red Cross officials whereby a station would be established at our Airport. This necessitated a period of training for the Airport personnel under the direction of a Red Cross official. Fifteen men volunteered to take the course, which was conducted outside of working hours over a period of six weeks. At the conclusion of the course a final examination was given which was passed successfully by each member of the class.

Early in October the First Aid Station was officially opened.

To date many victims of automobile accidents along the Bayshore Highway have received First Aid treatment at the Airport station, and appreciation for this much needed service has been manifested by the public and medical authorities.

PUBLICITY

In the matter of Airport publicity close cooperation has been maintained with the Bureau of Public Relations of the Public Utilities Commission. A tabu-

lated report of traffic operations is mailed to the Bureau each week, showing the number of transport plane arrivals and departures, passengers on and off, air mail pouches and poundage on and off, and express pieces and poundage on and off. Copies of this report are likewise sent to

Director, San Francisco Chamber of Commerce

Director, San Francisco Junior Chamber of Commerce

United Air Lines, Publicity Department

TWA, Traffic Department.

A monthly report of the same data is mailed to the above and also to the following:

Chief, Aeronautical Information Section, Bureau of Air Commerce, Washington, D. C.

Chairman, Aviation Committee, San Francisco Chamber of Commerce.

The management has been called upon frequently to give talks on Airport activities at meetings of various business and civic organizations.

The San Francisco peninsula newspapers have been generous in their accounts of Airport developments, and many news items have appeared also in monthly aviation periodicals throughout the nation.

FINANCIAL

A detailed account of the financial status of the Airport is contained in statements accompanying this report. A "Balance Sheet"; a statement of "Surplus Account," and an "Income Account" showing revenues and expenses, form a complete picture of the Airport finances at the close of the fiscal year. Although the statements may be readily interpreted, a few interesting items may be pointed out.

Another instalment of $105,000 has been paid on the ten year purchase contract of land. This contract was drawn in 1930, and calls for ten annual payments of $105,000. The present balance to be paid during the next four years is $420,000. The land being purchased comprises 1,102.5 acres.

Fixed capital at the field has increased $139,305.95 during the year. "Surplus" has increased $167,154.01.

It is not to be expected that a municipal airport engaged in such a vast development program as is San Francisco Airport should show a profit at this stage of its life. Increase in revenues has been shown, but expenditures have increased in an amount approximately equal. As improvements in facilities are completed, bonds amortized, and the field placed more and more in the demand of new air lines and aviation interests that are bound to come, the profits that will accrue from these sources will show themselves in striking figures.

SAN FRANCISCO AIRPORT

Income Account

REVENUES	Fiscal Year Ended June 30 1936	1935	1934
Hangar—Rentals	$10,161.81	$ 9,945.82	$10,220.22
Office—Rentals	1,069.00	813.50	1,131.70
Shop—Rentals	2,498.80	1,412.80	1,368.60
Restaurant—Rentals	720.00	1,176.00	.....
Passenger Tax	2,668.10	2,062.65	2,132.20
Handling Charges	10,354.50	8,840.95	5,804.50
Telephone Income	2,171.03	1,208.91	2,297.15
Miscellaneous	1,674.71	1,058.17	1,313.33
Total Revenues	$31,317.95	$26,518.80	$24,267.70

EXPENSES			
Salaries—Permanent	$13,477.08	$11,676.38	$10,148.73
Salaries—Temporary	20,590.40	19,381.30	13,491.86
Heat, Light and Water	6,827.78	6,414.16	6,495.91
Telephone, Telegraph and Postage	5,066.11	4,126.11	3,517.89
Materials and Supplies	4,235.48	4,021.73	3,141.67
Maintenance and Repairs	1,658.69	1,178.82	3,451.98
Taxes	2,088.32	1,712.52	1,669.87
Uncollectible Accounts, Estimated	900.00	1,200.00	1,500.00
Miscellaneous Contractual Services	762.56	140.74	698.57
Traveling	460.43	2,074.81	1,788.92
Miscellaneous Expense	408.20	599.93	1,198.81
Depreciation	9,600.00	9,600.00	9,600.00
Bond Interest	1,040.00	.....	.....
Total Expense	$67,115.05	$62,126.50	$56,704.21
Net Loss	$35,797.10	$35,607.70	$32,436.51

Surplus Account

For the Year Ended June 30, 1936

BALANCE JULY 1, 1935			
Fixed Capital Assets (in service) Transferred from General City and County Books			$1,032,734.83
Bond Fund Assets, net liabilities, Transferred from General City and County Books, representing General Fund Contributions for Bond Redemption and Interest			56,632.00
			$1,089,366.83
Provision for Depreciation, June 30, 1935			38,400.00
			$1,050,966.83
ADDITIONS:			
Federal Grants Received	$ 52,067.92		
Contribution from General Fund	150,883.19	$202,951.11	
DEDUCTIONS:			
Loss for the year ended June 30, 1936		35,797.10	
Net Increase of Surplus			167,154.01
Balance June 30. 1936			$1,218,120.84

SAN FRANCISCO AIRPORT

Balance Sheet—June 30, 1936

ASSETS

Fixed Capital in Service:		
Land, grading, runway, etc.	$1,529,495.88	
Buildings	219,133.13	
Equipment	68,836.36	
	$1,817,465.37	
Less Reserve for Depreciation	48,000.00	$1,769,465.37
Cash:		
Operating Fund	$ 10,703.05	
Bond Fund, for construction	13,029.50	
Bond Interest Fund	1,095.43	
Revolving Fund	200.00	25,027.98
Accounts Receivable:		
Federal Grants—Unaudited	$ 3,954.39	
Federal Grants—In Dispute	429.14	
Miscellaneous	8,910.89	
	$ 13,294.42	
Less Reserve for Bad Accounts	6,100.00	7,194.42
Inter Fund Accounts:		
Due Operating Fund from 1935-36 W.P.A. Projects	$ 281.55	
Due Operating Fund from General Fund	576.73	858.28
Deferred Charges:		
Prepaid Insurance	$ 71.19	
Sponsor's Contribution for Preliminary Expenses, P.U.I.F. and W.P.A. Projects	13,100.00	13,171.19
		$1,815,717.24

LIABILITIES

Bonds issued December 1, 1933 for Construction of runway extension; interest rate 4 per cent; due December 1, 1935 to 1938, inclusive, at the rate of $52,000.00 per year		$ 156,000.00
Bond Interest:		
Accrued—Not Due	$ 520.00	
Matured	980.00	1,500.00
Land Purchase Commitment:		
Purchase price of land, payable $105,000.00 per year, from September, 1930 to 1939, inclusive	$1,050,000.00	
Less payment to date	630,000.00	420,000.00
Accounts Payable:		
Warrants Outstanding	$ 2,042.94	
General Creditors	2,921.65	4,964.59
Inter Fund Accounts:		
Bond Fund Owes General Fund	$ 115.83	
Operating Fund Owes General Fund	4,219.05	
Bond Fund Owes Public Utilities Commission— Bureau of Engineering	1.40	4,336.28
Deferred Credits:		
Bond Premium Unamortized	$ 6,412.00	
Reserve for Uncollected Federal Grants	4,383.53	10,795.53
Surplus		
(Details annexed)		1,218,120.84
		$1,815,717.24

SAN FRANCISCO AIRPORT FACTS

Location:

San Francisco Airport is located on the Bayshore Highway 12 miles by road south of the Central Business District of San Francisco. Latitude, 37° 37′ N; Longitude, 122° 23′ W.

The airport property occupies portions of Sections 26, 27, 33, 34, 35 and 36, T. 3 S., R. 5 W., and Sections 2 and 3, T. 4 S., R. 5 W., MDB&M.

Elevation 5 to 12 feet above mean lower low water.

Property Areas:

Present flying field area	226 acres
Flying field extension under construction	103 acres
Seaplane port land area	103 acres
Reserved for expansion of Seaplane port land area	108 acres
Seaplane port water area	558 acres
Reserved for aircraft industrial development	556 acres
Miscellaneous areas	91 acres
Total Property Area	1,745 acres

Property Purchases:

Property owned in fee	1,284.4 acres	$760,250
Property under condemnation (estimated cost)	126.6 acres	6,330
Property held under agreement to purchase at 111.25 acres per year; final purchase to be completed in September, 1939	333.8 acres	315,000
Total	1,744.8 acres	$1,081,580

Runways:

East-west runway, 3100 ft. by 300 ft.; paved 3000 ft. by 150 ft.
Northwest-southeast runway, 4000 ft. by 300 ft.; paved 3000 ft. by 150 ft.
Northeast-southwest runway, 3100 ft. by 300 ft.; not paved.
East-west taxiway, 1200 ft. by 175 ft.; paved 1200 ft. by 50 ft.
Northwest-southeast taxiway, 2950 ft. by 175 ft.; paved 2000 ft. by 50 ft.
Apron, paved 1250 ft. by 288 ft.

Pavement:

Asphaltic pavement	1,487,319 sq. ft.
Concrete pavement	138,790 sq. ft.
Concrete walks	17,243 sq. ft.
Total	1,643,352 sq. ft.

Drainage:

Drainage pipe, 4″ to 24″ size, in gravel backfilled trenches, for subsurface drainage	115,000 lin. ft.
Drainage pumping plant; two 25 HP motor driven 5700 GPM vertical centrifugal pumps	1 unit

Buildings:

Hangar No. 1; 105′ x 100′; pile and concrete foundation, concrete floor, steel frame; gross floor area.....10,500 sq. ft.

Hangar No. 2; 121.04′ x 84.04′; pile and concrete foundation, concrete floor, steel frame; gross floor area.....10,172 sq. ft.

Hangar No. 3; 120′ x 83.60′; pile and concrete foundation, concrete floor, steel frame; gross floor area.....10,032 sq. ft.

Hangar No. 4; 121.04′ x 83.60′; pile and concrete foundation, concrete floor, steel frame; gross floor area.....10,119 sq. ft.

Shop and office addition to Hangar No. 2; 2-story, 121.83′ x 19′; pile and concrete foundation, concrete first floor, timber frame, stucco exterior; gross floor area..... 4,630 sq. ft.

Shop and office addition to Hangars 3 and 4; one-story, 240′ x 19.67′; pile and concrete foundation, concrete floor, timber frame, stucco exterior; gross floor area..... 4,721 sq. ft.

Machine Shop Building; 70.21′ x 60.21′; partially 2-story, pile and concrete foundation, concrete floor, steel frame, sheet metal exterior finished to resemble stucco; gross floor area... 6,716 sq. ft.

Administration Building; 206.00′ x 86.00′ with provision for future 86′ x 66′ north wing; partially 2-story with 4-story tower; pile and concrete foundation; reinforced concrete fire resistive construction; gross floor area.....29,365 sq. ft.

Miscellaneous buildings—fire house, comfort station, field lighting terminal, drainage pumphouse.

Water Supply:

Brought from San Francisco Water Department's 44″ Crystal Springs and San Andres pipe lines at the intersection of El Camino Real and San Felipe Avenue, about one mile west of the airport buildings.

Standard fire hydrants .....7 hydrants

Sewerage System:

Consists of cast iron collecting sewers (including 8 standard manholes) discharging into a concrete sump. Sewage is pumped from the sump by two automatically controlled pumps. The discharge line discharges into tidal water at the southeast corner of the landing field.

Electrical System:

FIELD LIGHTING

4 6000-watt incandescent landing field flood lights, each using 4 1500-watt 32-volt lamps.
5 concrete vaults housing the transformers and oil switches for controlling the 4 floodlights, with provision for future installation of 6 additional 6000-watt floodlights.
2 24-inch arc flood lights with 15 HP motor-generator unit.
1 2-head revolving airport beacon, each head with 1000-watt lamp and automatic lamp changer.
1 1000-watt ceiling projector and alidade.
60 boundary and runway marker lights with metal cones and concrete bases.
50 field limit and hazard lights.
1 field lighting control desk in central tower.
1 illuminated wind cone.

GENERAL AIRPORT LIGHTING AND POWER SYSTEM

1 central 4000-volt primary power substation with provision for a gasoline-driven standby generator.
3 secondary 4000-volt transformer substations.
1 Neon airport sign.
6 street lighting electroliers.
2 25-HP motors driving drainage pumps.
2 5-HP motors driving sewage pumps.

TELEPHONE AND RADIO

4,300 lineal feet of telephone underground duct lines.

One radio receiving equipment unit, consisting of a remote control radio receiver building, control desk in control tower, and 5 independent receiving units with provision for 5 additional receiving units.

One transmitting unit.

Earth and Rock hauled to airport for field improvement and land reclamation:

Improvement of landing field and building area	130,000 cu. yds.
Landing field extension, land reclamation	409,000 cu. yds.
Seaplane port land reclamation	760,000 cu. yds.
Total	1,299,000 cu. yds.

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